CLAIMS

1. Process for the valorisation of metal values in a Zn-, Fe- and Pb-bearing residue, comprising the steps of:
- subjecting the residue to a flash or agitated bath fuming step, thereby producing an Fe-bearing slag and Zn- and Pb-bearing fumes; and
- extracting the Zn- and Pb-bearing fumes and valorising Zn and Pb;
characterised in that either one or more of CaO, SiO_2 and MgO are added as a flux before or during the fuming step so as to obtain a final slag composition with:

$$\frac{[Fe]}{[SiO_2]}+\frac{[CaO]}{[SiO_2]}+\frac{[MgO]}{3}>3.5;$$

$$0.1<\frac{[CaO]}{[SiO_2]}<1.3; \text{ and}$$

$$6<[SiO_2]<22,$$

all concentrations being expressed in wt%.

2. Process according to claim 1, wherein the Zn-, Fe- and Pb-bearing residue is a neutral leach residue or a weak acid leach residue.

3. Process according to claim 2, characterised in that only one or both of dolomite and limestone are added as a flux.

4. Process according to any one of claims 1 to 3, characterised in that the concentration of MgO in the final slag is less than 5 wt%.

5. Process according to one of claims 1 to 4, characterised in that the Zn-, Fe- and Pb-bearing residue contains Cu and precious metals, and that, during the fuming step, a matte or alloy is produced containing a significant part of the Cu and a significant part of the precious metals.

6. Process according to any one of claims 1 to 5, characterised in that the Zn-, Fe- and Pb-bearing residue contains Ge, that a major part of the Ge is fumed together with Zn and Pb, and that it is subsequently separated.

7. Process according to claim 6, whereby the separation of Ge is performed by co-precipitation with Fe hydroxide or by addition of tannic acid.

8. Process according to any one of claims 1 to 7, whereby the process is performed in a reactor selected from the list consisting of a plasma flash furnace and a submerged lance furnace.

9. Process according to any one of claims 1 to 7, whereby the fuming step is performed in a reactor containing a molten phase, and comprising one or more plasma tuyeres as heat and gas sources, said tuyeres being arranged such that the plasma is generated under the surface of said molten phase.

10. Single-chamber smelting and fuming reactor for treating Zn-bearing residues, said reactor being designed to contain a molten slag phase up to a determined level, said reactor comprising one or more plasma tuyeres as heat and gas sources, said tuyeres being arranged such that the plasma is generated under said level.

11. Single-chamber smelting reactor according to claim 10, characterised in that the peripheral walls of the reactor are water-cooled.